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(56) Documents cited

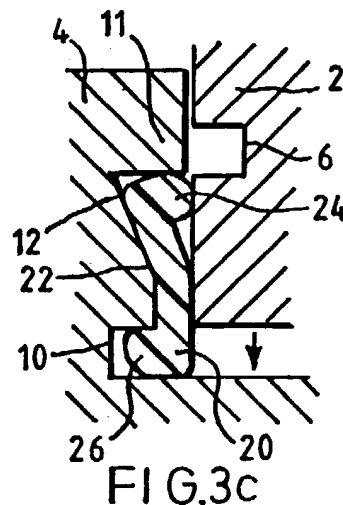
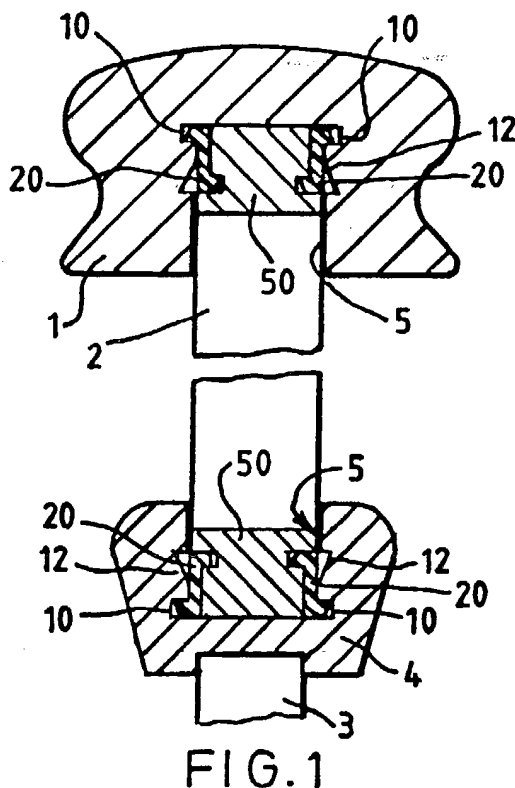
None

(58) Field of search

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INT CL<sup>5</sup> F16B

(54) Joint

(57) For joining e.g. a handrail or string-capping of a balustrade to the balusters, the handrail or string-capping 1, 4 is provided with a longitudinal channel 5 in the sides of which are seats accommodating S-section plastics clips 20, and the baluster end has lateral grooves 6 for engaging the lips 24 of the strips 20 with a snap action. The balustrade components can thus be held together without the use of screws or nails and consequently can be factory-finished for assembly on site.



The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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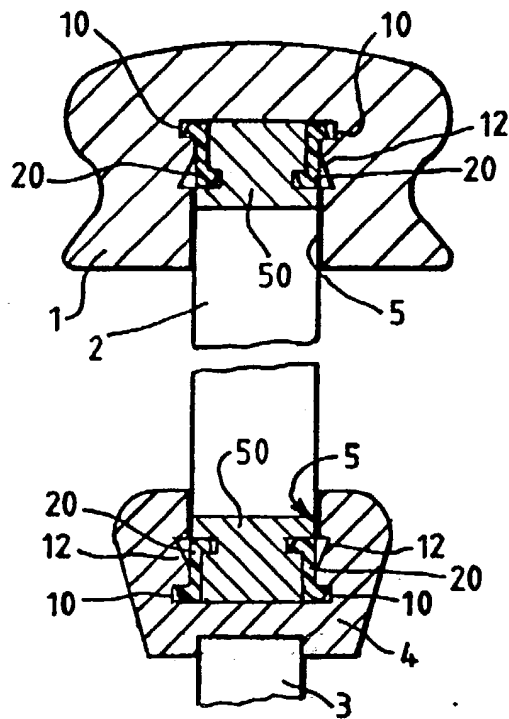


FIG. 1

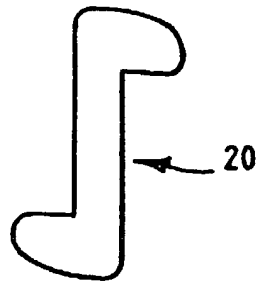


FIG. 2

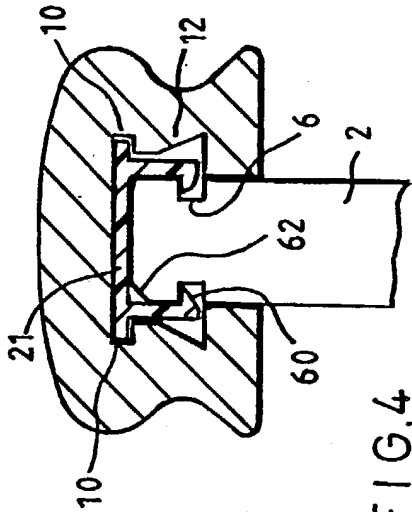


FIG. 4

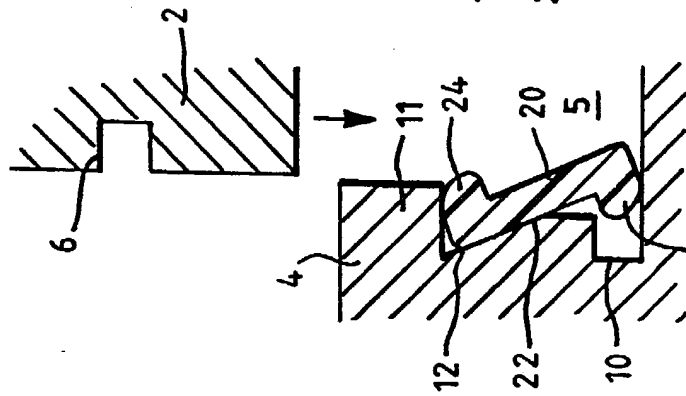


FIG. 3a

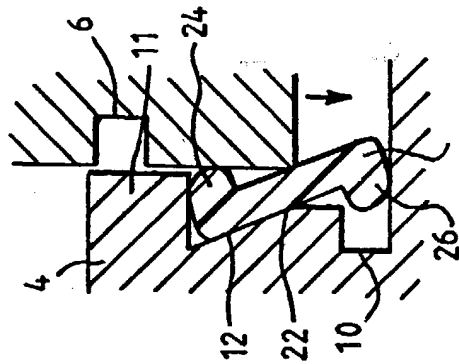


FIG. 3b

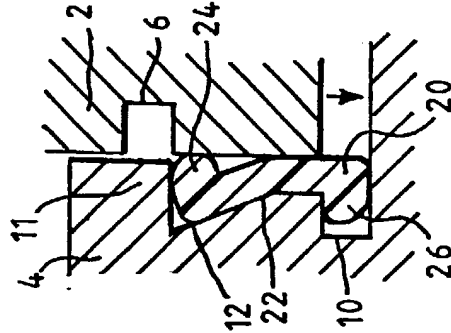


FIG. 3c

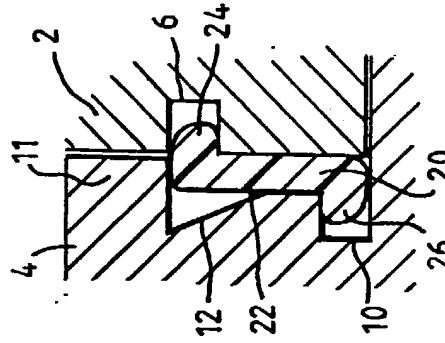


FIG. 3d

JOINT

This invention relates to joints, and in particular to joints for use in stem and cross bar arrangements such as those generally found in the internal and external fixtures and fittings of buildings; and more particularly to joints for use in the construction of railings such as balustrades of stairs and landings.

The staircase is usually the most complex piece of joinery in a house. Most builders do not construct staircases themselves but buy at least partly prefabricated units from a manufacturer.

In the building trade generally there is an increasing tendency to reduce the amount of work done on site, by factory assembly and factory finishing.

Typically the builder buys prefabricated stairs, but assembles and fixes the balustrade on site using standard components for the rails and balusters.

Traditional methods of assembly involve nailing the balusters to the handrail at the top, and to the floor rail or string capping at the bottom.

The use of nails or screws on site makes it effectively

pointless to supply the rails and balusters with a factory finish, because the fixings will inevitably damage the finish and remain visible unless made good on site, which largely nullifies the advantages of factory finishing.

This problem is not only restricted to staircases, but also occurs in relation to many other structures where joints and fixings should be visibly good. Examples of these include glazing applications, particularly glazing bars, rails, mullions and transoms, and also certain types of furniture.

The object of the present invention is to provide a means and method for assembling a structure such as a balustrade such that the fixing means are concealed and do not require to be made good, so that factory-finished components can be used, and also to simplify on-site work and reduce the skill required.

According to the present invention, a joint comprises a first longitudinal member provided with a channel running substantially in the longitudinal direction of the member, and a second member provided with a portion insertable in said channel; wherein said joint also comprises mutually interlocking configurations provided in the channel of the first member and on the said portion of the second member in such a manner that the interlocking configurations interlock so as to secure an

engagement between said first member and said second member when the said portion of the second member is inserted into the channel disposed in the first member.

In a preferred arrangement one of the configurations is disposed along a substantial portion of the length of the channel.

The said configurations may be such as to permit assembly by sliding in the longitudinal direction of the channel, or in a snap-on manner.

The said configurations may be integral parts of the first member, or may preferably comprise separate elements. The configuration relating to the second member is preferably an integral part of the second member.

In a preferred embodiment, a portion of the configuration disposed on the first member is a pair of strips of substantial length disposed one on each side of an end portion of said second member and between said second member and the inner surface of a channel disposed in said first member into which channel said end portion of said second member is inserted and retained.

The portion of the configuration disposed on the first member may also, for example, be of substantial length

and comprise a pair of spaced strips, linked by a web, between which strips the second member may be inserted.

In a preferred embodiment of the present invention, said first member is a handrail or a string-capping of a balustrade, and said second member is a baluster and/or a distance piece between balusters.

According to the present invention there is also provided a joint for joining a first member to a second member comprising a pair of clips disposed on either side of an end portion of said second member and between said second member and the inner surface of a channel disposed in said first member into which channel said end portion of said second member is inserted.

Two embodiments of the invention will be described by way of example, with reference to the accompanying drawings in which: -

Figure 1 shows in cross-section, a string-capping and baluster secured to a handrail by means of pairs of retaining strips;

Figure 2 is a cross-section of one of a pair of retaining strips;

Figures 3A to 3D show in cross-section part of a baluster, part of a string-capping and a retaining

strip as shown in Figure 2, in various stages of fitting; and

Figure 4 shows an alternative embodiment of a retaining strip.

The illustrated balustrade is for a stair. Accordingly, it comprises a sloping handrail 1 of any convenient cross-section, and balusters 2 with their ends cut to suit the incline of the stair.

The stair has a string member 3 at its side, which is covered by an essentially conventional string capping 4 parallel to the handrail. If the balustrade were to be installed on a landing or other level surface instead of on a stair, the stair string and string capping would be replaced by a floor rail.

The underside of the handrail and the upperside of the string capping have corresponding channels 5 of generally rectangular cross-section, each with an inner groove 10 running along each side wall of the channel and substantially adjacent the base of the channel; and an outer groove 12 running longitudinally along each side wall of the channel between the inner groove 10 and the lip of the side wall of the channel.



Each outer groove 12 is substantially a saw-tooth shape, in cross-section, having two sides, one side being disposed closer to the base of the channel and being inclined at an angle to the side wall of the channel 5, and the other being disposed closer to the lip of the channel and being orientated substantially parallel to the base of the channel. Each lip of each channel projects from the side wall of the respective channel so as to define an overhang 11 at the mouth of the channel. One wall of each said overhang is disposed adjacent the outer groove and also defines the side of the outer groove which is closest to the overhang.

The retaining strip 20 shown in Figure 2 is substantially rectangular in cross-section, but with a protuberance 24, 26 running along each opposite major face of the strip and at mutually opposite ends of the strip, so as to be effectively Z-shaped in overall cross-section.

When each baluster is fully inserted into the channel, the end face of the baluster substantially abuts on the base of the channel 5.

Each end of each baluster has two transverse grooves 6 formed in it, one in each of two opposite sides, at a distance from the end surface of the baluster which corresponds to the positions of the outer grooves 12 in a channel 5 when the baluster is inserted fully in the

channel. Accordingly the transverse grooves 6 are disposed so as to be substantially parallel to the plane of the end surface of the baluster.

The balustrade further comprises distance pieces 50 shaped and dimensioned to fill the channels 5 between the balusters. Each distance piece has a pair of grooves 6, running along each of its sides, so that in cross-section its profile is similar to that of the end portion of a baluster.

The balustrade is assembled in the following manner.

First, newel posts, the handrail 1, and the string capping 4 or floor rail, are erected. Next the retaining strips 20 are inserted on either side of each channel in the handrail and the string capping or floor rail. Each retaining strip is positioned so that the side of its protuberance 26 rests on the base of the channel, and its face 22 is disposed flush against the inclined surface of the outer groove 12. In such a position, the protuberance 26 is disposed adjacent the inner groove 10 and opposing protuberance 24 faces into the channel 5. The edge of the retaining strip 20 adjacent the protuberance 24 projects from under the overhang 11 and into the channel 5. The protuberance 26 is not housed within the inner groove 10, but the protuberance 24 is housed within the outer groove 12.

The retaining strip 20 should be made from a resilient, and preferably extruded common material such as, for example, resilient metal or a plastics material.

Next, the balusters are inserted between the handrail and the string capping or floor rail, and are manipulated into vertical positions. As each baluster is so manipulated, it is pushed into the channel 5 of the string capping or handrail, between opposing retaining strips. This has the effect of forcing each retaining strip to bend about the inner edge of the outer groove 12, as shown in Figure 3c. As the baluster is inserted further into the channel, each side of each baluster forces each protuberance 26 into a respective inner groove 10. The retaining strips are prevented from merely pivoting about the edges of the outer groove 12 by the sides of the baluster, which engage the protuberances 24. The clearance between the baluster and the side of the channel, in the region between the grooves 10, 12, is substantially equal to the thickness of the strip 20 in its region between the protuberances. As a result, a combination of tensile and compressive stresses are exerted upon each retaining strip, particularly in the region of each inner edge of each outer groove 12. However, as the end of each baluster reaches the base of the channel, the groove 6 in the baluster becomes aligned with the upper protuberance 24, thereby allowing the tensile and

compressive stresses to be released in such a manner as to cause the retaining strip to straighten out so that each protuberance 24 springs into a respective groove 6 in the baluster. Each baluster is then held securely in position within the string capping or handrail. Overhang 11 and inner groove 10 together securely hold respective retaining clip 20 in position, and in turn, the retaining strips 20 hold the baluster in position within the respective channel.

The balusters should be inserted starting from one end of the balustrade. After each baluster has been inserted and before the next has been inserted, distance pieces should be inserted into the handrail and string capping in a similar manner to that in which the balusters are inserted.

The above embodiment has the advantage that, due to the use of two separate retaining strips in each channel, a single size of retaining strip may be used in balustrades having balusters, distance pieces, and handrail and string capping grooves of various widths.

However, for further improved ease of fitting, the retaining strips may be formed with a connecting web 21 in between to form a single combined strip. In this case, the protuberance 24 and/or the side edges of the end face of the baluster to be inserted should have an

inclined outer cam surface 60 or 62 as shown in Figure 4. Because protuberances 26 are formed so as to fit into inner grooves 10, and because protuberances 24 must project from under the overhang 11, in order to enable an edge of the end face of a balustrade to force the protuberances 24 into the grooves 12 so that stresses are exerted in the strip a cam surface is necessary. Each protuberance 24 will then spring into an outer groove 3 in the balustrade once the balustrade is fully inserted into the channel 5. Analogous cam or lead-in surfaces may advantageously be provided on the clips of Fig. 2 and/or on the balustrade components, in particular to facilitate the insertion of distance pieces. It will be understood that after balusters have been inserted, the clips cannot pivot bodily as shown in Fig. 3, and inserting the distance pieces involves deflecting the outer regions (protuberances 24) of the clips to a position similar to that of Fig. 3C. Lead-in surfaces on the protuberances of the clips and/or on the edges of the distance pieces facilitate this deflection.

Although the above embodiments envisage the retaining strips as having a length substantially equal to that of the balustrade, this is not necessary. It is possible for each retaining strip to be much shorter, effectively providing a series of clips which may be disposed at appropriate positions within the string capping or handrail. Furthermore, the above joint may be used in

glazing applications, particularly for use in the fixation of glazing bars, rails, mullions and transoms. It may also be used in the construction of furniture, for example, in the back rests of chairs and the like. The invention is also applicable to other railings, such as those used for dividing rooms and public spaces. Generally, applications will be found in many other situations, particularly where a member is fixed endwise in a transverse member.

The balusters, handrails and string cappings described above may be manufactured from any conventional and mechanically suitable material eg wood or metal. However, it is necessary that the retaining strip be formed from a resilient material

It is to be understood the foregoing is given by way of example only, and numerous modifications within the scope of the invention will suggest themselves to those skilled in the art. Accordingly, the above embodiments are not intended to limit the scope of the present invention in any way.

CLAIMS

1. A joint comprising a first longitudinal member provided with a channel running substantially in the longitudinal direction of the member, a second member provided with a portion insertable in said channel, and mutually interlocking configurations provided in the channel of the first member and on the said portion of the second member in such a manner that the interlocking configurations interlock so as to secure an engagement between said first member and said second member when the said portion of the second member is inserted into the channel disposed in the first member.
2. A joint as claimed in claim 1 in which one of the configurations is disposed along a substantial portion of the length of the channel.
3. A joint as claimed in claim 1 or 2 in which the said configurations are such as to permit assembly by sliding in the longitudinal direction of the channel, or in a snap-on manner.
4. A joint as claimed in claim 1, 2 or 3 in which the said configuration of the first member comprises separate elements.

5. A joint as claimed in claim 1, 2, 3 or 4 in which the configuration relating to the second member is an integral part of the second member.

6. A joint as claimed in any of the preceding claims in which a portion of the said configuration disposed in the first member is a pair of strips of substantial length disposed one on each side of an end portion of said second member and between said second member and the inner surface of a channel disposed in said first member, into which channel said end portion of said second member is inserted and retained.

7. A joint as claimed in claim 6 in which each said strip is of generally S-shaped or Z-shaped cross section, and the said channel comprises a seat for accommodating the thickness of the intermediate part of the strip cross section adjacent a side of the second member, an overhang adjacent one end of the said one strip for retaining the strip in the channel with the end region of the strip cross section projecting into the channel, and an undercut adjacent the other end region of the strip for accommodating and retaining the other end region of the strip, said other end region comprising a portion projecting outwardly from the channel; the said end portion of the second member being



provided with a lateral shoulder arranged and adapted to receive and be retained by the said one end region of the strip projecting into the channel; the said strip and channel being arranged and adapted to enable the said one end region to be withdrawn or deflected outwardly of the channel to permit insertion of the said end portion of the second member past said one end region and thereafter to enable the said one end region to engage the said shoulder to retain the second member.

8. A joint as claimed in claim 6 or 7 in which the strips are a pair of spaced strips linked by a web, between which strips the second member may be inserted.

9. A joint for joining a first member to a second member comprising a pair of clips disposed on each side of an end portion of said second member and between said second member and the inner surface of a channel disposed in said first member into which channel said end portion of said second member is inserted.

10. A joint as claimed in claim 9 in which each said clip is of generally S-shaped or Z-shaped cross section, and the said channel comprises a seat for accommodating

the thickness of the intermediate part of the clip cross section adjacent a side of the second member, an overhang adjacent one end of the clip for retaining the clip in the channel with the said one end region of the clip cross section projecting into the channel, and an undercut adjacent the other end region of the clip for accommodating and retaining the other end region of the clip, said other end region comprising a portion projecting outwardly from the channel; the said end portion of the second member being provided with a lateral shoulder arranged and adapted to receive and be retained by the said one end region of the clip projecting into the channel; the said clip and channel being arranged and adapted to enable the said one end region to be withdrawn or deflected outwardly of the channel to permit insertion of the said end portion of the second member past said one end region and thereafter to enable the said one end region to engage the said shoulder to retain the second member.

11. A joint as claimed in any of the preceding claims in which said first member is a handrail or a string-capping of a balustrade, and said second member is a baluster and/or a distance piece between balusters.

12. A joint substantially as described with reference to Figures 1 to 3d or Figure 4 of the accompanying drawings.

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**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

9017836.9

**Relevant Technical fields**

(i) UK CI (Edition K ) F2M(MA,MB5,ME)

(ii) Int CI (Edition 5 ) F16B

**Databases (see over)**

(i) UK Patent Office

(ii)

Search Examiner

M J PENNELL

Date of Search

14 FEBUARY 1992

Documents considered relevant following a search in respect of claims

1-12

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE FOUND	

SF2(p)

sf - c:\wp51\doc99\fil001831

Category	Identity of document and relevant passages	Relevant to claim(s)

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